

In re Patent Application of:
TAYLOR
Serial No. 10/814,984
Filed: MARCH 31, 2004

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REMARKS

The rejection of Claims 1-31, under the provisions of 35 U.S.C. 103, for the reasons discussed on pages 2-5 of the outstanding Office Action, is respectfully traversed.

Prior to discussing the shortcomings of the prior art relied upon in the outstanding Office Action to reject the claims, the present invention will be briefly reviewed in order that differences between the prior art and the claims of the present application may be more readily appreciated.

As is discussed in the initial portion of the present specification, multi-pin feedthrough connectors of the type shown in Figure 1 of the drawings of the present application have been proposed to provide hermetic sealing of a plurality of conductor pins within a surrounding connector shell. The shell includes an insert made of a material such as stainless steel that allows hermetic sealing of the conductor pins. Because the surrounding shell is made of aluminum, it and the stainless steel are dissimilar metals which are not readily joined.

In order to overcome this problem, the surrounding shell pin is typically explosion welded to stainless steel, shown as having an inverted L cross-section at the bottom of the shell.

This small region of stainless steel allows a joint to be formed between the stainless steel piece 32 and the stainless steel insert 20 into which the pins are hermetically sealed.

A drawback to the structure of Figure 1 is the relative narrowness of the annular shaped explosion bond formed between the inverted L-shaped stainless piece 32 and the underside of the connector shell 10, which facilitates the propagation of defects

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in the explosion bond region, as described at the top of page 6 of the present specification.

The present invention obviates this problem by forming the metal insert of two dissimilar metals having respectively different coefficients of thermal expansion. The metal insert, shown at 200, in each of Figures 2 and 3 of the drawings of the present application, includes an upper metal insert portion 202, such as stainless steel, and a lower metal insert portion 201, such as aluminum or aluminum alloy, which readily bonds with the aluminum of the surrounding outer metallic shell 100.

In accordance with the definition of the invention in Claim 1, upon which Claims 2-14 depend, the conductor pin-retaining metallic insert (200) comprises a laminate of dissimilar metals. This laminate of dissimilar metals includes a first metal (corresponding to the stainless steel insert portion 202) having a first coefficient of thermal expansion (that of stainless steel), and a second metal (the aluminum insert portion 201) having a second coefficient of thermal expansion (that of aluminum or aluminum alloy) that is different from the first coefficient of thermal expansion. A hermetic bond 300 is formed between the second metal (aluminum or aluminum alloy) 201 of the metallic insert 200 and metallic material (aluminum) of the outer metallic shell.

Independent Claim 15, upon which Claims 16-22 depend, defines a multi-pin connector for hermetically sealing a plurality of connector pins therein. The multi-pin-retaining metallic insert again comprises a laminate of dissimilar metals. These include a first metal corresponding to the stainless steel portion (202), which extends to a first side of the insert and has a compatibility with the hermetic sealing of an electrically

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insulated metal pin (207). It also includes a second metal (aluminum or aluminum alloy) shown at 201, which extends to a second side of the insert and has a metallurgical compatibility with the outer metallic shell 100 to facilitate a hermetic bond therebetween. A bond joint 300 is formed between the second metal (the aluminum or aluminum alloy metal portion 201 of the metallic insert) and metallic material at a side of the outer shell 100 adjacent to the second side of the metallic insert shown at 210.

Independent Claim 23, upon which Claims 24-31 depend, recite the method of forming a multi-pin connector and corresponds essentially to the method of assembling the structure defined above in Claim 15.

When comparing what is defined in each of the independent claims of the present application with the prior art cited in the outstanding Office Action, several differences become immediately apparent.

First of all, the acknowledged prior art shown in Figure 1 of the drawings of the present application has a metallic insert 20 containing one (and only one) metal. The metallic insert is designed to have a sufficiently high melting point to allow for hermetic sealing of the pins, and a compatible coefficient of thermal expansion with metal that is explosion welded to the metallic shell, namely to the explosion welded inverted L-cross section stainless steel piece at the bottom of the shell 10.

No where in the discussion of the admitted prior art in the background portion of the present specification is there any disclosure or suggestion that the metallic insert 20 is made of

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two dissimilar metals having the properties called for in each of independent Claims 1, 15 and 23, discussed above.

A review of the Office Action reveals that this shortcoming of the acknowledged prior art has been recognized in view of the statement at the bottom of page 2 of the Office Action that the acknowledge prior art discloses the instant claimed invention as described above "except for the conductor pin-retaining metallic insert comprising a first metal and a second metal which a first coefficient of thermal expansion different with a second coefficient of thermal expansion, respectively."

The statement of the rejection then relies upon the US Patent to Shindo et al, 5,025,347, which relates to the packaging of a semiconductor device, in particular a semiconductor chip and its connection with a printed circuit board from which lead pins extend.

In the statement of the rejection in the paragraph bridging pages 2 and 5 of the Office Action, reference is made to a first metal system "1" and a second metal system "5" in Shindo et al. A study of the patent to Shindo et al reveals that item 1 is a metal stem such as a flat plate made of steel, as described in column 3, lines 26 and 27. Item number "5" referred to in the Office Action is a printed circuit board which, by definition, includes a plurality of metallic traces on an insulating substrate.

How or even why one would be led to modify the structure shown in Figure 1 of the drawings of the present application to include a first metal and a printed circuit board associated therewith to join an outer shell with the insert to

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which the pins are hermetically sealed is far from clear to applicant. There is no teaching or suggestion anywhere in the patent to Shindo et al of modifying the structure of Figure 1 of the drawings of the present application which would result in a configuration such as those shown in Figures 2 and 3 upon which applicant claims would read.

For one thing, the structures are completely different types of structures, one (Figure 1 of the present application) being a multi-pin metallic insert-type connector in which a plurality of metallic pins are hermetically sealed with a metal intended for the purpose, and the other (Shindo et al) which relates to the packaging of an integrated circuit and the manner in which a printed circuit board is used to lead out traces from an integrated circuit to lead pins that project through the bottom of the board.

Applicant questions where in the patent to Shindo et al is there a teaching of altering the structure of Figure 1 of the present application to yield the structures of Figures 2 or 3. There is no teaching of providing dissimilar metals which lie atop one another and extend to the sides of the metallic shell to allow bonding of the higher CTE material with the corresponding CTE material of the surrounding shell, while still retaining a low CTE material (stainless steel) for hermetically sealing of the pins, that material lying atop the higher CTE aluminum or aluminum alloy layer.

It is respectfully submitted that upon reconsideration, it will be realized that the prior art cited in the outstanding Office Action contains neither a teaching nor a suggestion of the combination that features call for applicant's claims, whereby all of the claims are in condition for allowance. It is

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respectfully requested, therefore, that the application be favorably be reconsidered and that a Notice of Allowability of Claims 1-31 be forthcoming.

Should any minor informalities need to be addressed, the Examiner is encouraged to contact the undersigned attorney at the telephone number listed below.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees, to Deposit Account No. 01-0484 and please credit any excess fees to such deposit account.

Respectfully submitted,



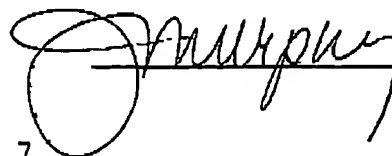
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